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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/971,831	10/04/2001	Haiqing Wei	0980/66019	4311

7590

08/24/2004

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EXAMINER

PAYNE, DAVID C

ART UNIT PAPER NUMBER

2633

DATE MAILED: 08/24/2004

[Handwritten signature]

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/971,831

Applicant(s)

WEI ET AL.

Examiner

David C. Payne

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2001.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12, 14-16, 18-27, 29, 30, 33-35 and 40-49 is/are rejected.
7) ☒ Claim(s) 13, 17, 28, 31, 32, and 36-39 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 04 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 19, 22-24, 30, 35 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winzer et al., Return-to-Zero Modulator Using a Single NRZ Drive Signal and an Optical Delay Interferometer, IEEE 2001 (hereinafter Winzer) in view of Ono et al. US 6,097,525 (hereinafter Ono).

Regarding claim 1-4, 35, 42

Winzer disclosed

An apparatus for generating return-to-zero (RZ) optical pulses corresponding to an information signal, comprising: a phase modulator for causing a phase change in an optical carrier signal responsive to a transition in a driving signal derived from the information signal; and an interferometer coupled to receive an output of said phase modulator, said interferometer causing a fixed time delay between first and second signals derived from said output of said phase modulator, , an output of said interferometer comprising RZ optical pulses corresponding to said transitions in said driving signal. (see e.g., Figure 1, page 1

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column 2 paragraphs 1 and 2, page 2 column 1 paragraphs 1 and 2).

Winzer does not disclose

said fixed time delay being selected such that said first and second signals destructively interfere when no phase change is occurring in said output of said phase modulator and such that said first and second signals do not destructively interfere when said phase change does occur. Ono disclosed fixed time delay being selected such that said first and second signals destructively interfere when no phase change is occurring (e.g., col/line: 6/23-45, 9/10-20).

It would have been obvious to one of ordinary skill in the art at the time of invention to use fixed time delay in the Winzer invention for the benefit of aligning out of phase components of the signal.

Regarding claim 19, 30

Winzer disclosed

A method for generating return-to-zero (RZ) optical pulses corresponding to an information signal, comprising: generating a driving signal from said information signal, said driving signal having two or more levels, said driving signal having level transition intervals of finite duration; generating a phase-modulated optical signal from an optical carrier signal by causing phase changes therein during said level transition intervals of said driving signal; generating first and second optical signals from said phase-modulated optical signal, said second signal being a substantially identical but delayed version of said first signal, said second signal being delayed with respect to said first signal by an unmodulated, predetermined, , and such that said first and second optical signals do not destructively

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interfere when said phase change does occur, whereby said resultant optical signal comprises RZ optical pulses during said level transition intervals of said driving signal. (see e.g., Figure 1, page 1 column 2 paragraphs 1 and 2, page 2 column 1 paragraphs 1 and 2).

Winzer does not disclose

fixed time delay τ ; and combining said first and second optical signals to produce a resultant optical signal; wherein said fixed time delay τ is selected such that said first and second optical signals destructively combine when no phase change is occurring in said phase-modulated optical signal.

Ono disclosed fixed time delay being selected such that said first and second signals destructively interfere when no phase change is occurring (e.g., col/line: 6/23-45, 9/10-20).

It would have been obvious to one of ordinary skill in the art at the time of invention to use fixed time delay in the Winzer invention for the benefit of aligning out of phase components of the signal.

Regarding claim 22-24,

Winzer and Ono disclosed,

wherein said driving signal and said information signal are electrical signals, and wherein imposing a compensating frequency shift comprises: splitting the driving signal into first and second electrical signals; combining the first and second electrical signals to form a third electrical signal; and phase-modulating said RZ optical pulses with a phase modulator driven by the third electrical signal. . (see e.g., Winzer Figure 1, page 1 column 2 paragraphs 1 and 2, page 2 column 1 paragraphs 1 and 2).

3. Claims 5-12, 14-16, 18, 20, 21, 25-27, 29, 33, 34, 40, 41 and 43-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winzer et al., Return-to-Zero Modulator Using a Single NRZ Drive Signal and an Optical Delay Interferometer, IEEE 2001 (hereinafter Winzer) in view of Ono et al. US 6,097,525 (hereinafter Ono) as applied to claims 1, 35 and 42 above, and further in view of Kou et al. US 6,046,838 (hereinafter Kou).

Regarding claim 5, 6, 10,

The modified invention of Winzer and Ono does not disclose wherein said driving signal is proportional to said information signal, said output of said interferometer having a binary pattern equal to a differentially encoded version of a binary pattern of said information signal. Kou disclose differentially encoded version of a binary pattern of said information signal (e.g., Figure 4, col./line: 2/15-35, 7-12).

Regarding claim 7-9, 11, 33 and 34

The modified invention of Winzer, Ono does not disclose an optical source for providing said optical carrier signal at a carrier frequency; and a feedback control circuit for precisely regulating either or both of (i) said fixed time delay of said interferometer, and (ii) said carrier frequency of said optical source. It would have been obvious to one of ordinary skill in the art at the time of invention to measure average optical power for the benefit of obtaining stable power levels rather than measuring extremes. Kou disclosed using feedback.

(Figure 1 and 4). It would have been obvious to one of ordinary skill in the art at the time of invention to use feedback for controlling modulation of the signal.

Regarding claims 12 and 14, 25-27

The modified invention of Winzer, Ono does not disclose feedback control circuit comprising: a detector coupled to an auxiliary output of said interferometer, said detector measuring an average optical power at said auxiliary output; and a control circuit coupled to said detector and to a fixed time delay element of said interferometer, said control circuit manipulating either or both of said fixed time delay and said carrier frequency such that said average optical power is maintained at an extremum. Kou disclosed a detector coupled to an auxiliary output of said interferometer, said detector measuring an average optical power at said auxiliary output; and a control circuit coupled to said detector and to a fixed time delay element of said interferometer, said control circuit manipulating either or both of said fixed time delay (Figure 1 and 4). It would have been obvious to one of ordinary skill in the art at the time of invention to measure average optical power for the benefit of obtaining stable power levels rather than measuring extremes.

Regarding claims 15, 18 and 40, 43-49

The modified invention of Winzer, Ono does not disclose phase modulator and said interferometer are integrated onto a common substrate having a material system selected from the group consisting of: lithium niobate, semiconductor, InP, and GaAs. Kou disclosed

using such material. It would have been obvious to one of ordinary skill in the art at the time to use such material since they have excellent properties for high-speed optical transmission.

Regarding claim 16, 20, 21, 29, 41

The modified invention of Winzer, Ono and Kou disclosed a folded waveguide structure formed at an edge of said common substrate for coupling said interferometer to said phase modulator. (e.g., Kou Figure 4, col./line: 3/20-25, 6/5-15).

Allowable Subject Matter

4. Claims 13, 17, 28, 31, 32, and 36-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Payne whose telephone number is (571) 272-3024. The examiner can normally be reached on M-F, 7a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dcp



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